

active center which formed over the China Sea and moved into the Continent during October. This is extraordinary for this time of the year. It is having its effect in a shortage of rain over various provinces of the Philippines, and the rice crop is not as plentiful as it might be. The typhoon activity continues to take place far to the east of the Archipelago, continuing the October 1940 conditions.

ADDITIONAL REPORT

Depression, November 25-30, 1940.—Pressure at Yap was rising and winds were veering toward the southeast during the afternoon of November 25, indicating the presence of a disturbance east of Mindanao. November 26, there was a depression about 120 miles east-northeast of Catanduanes Island, moving northwesterly. The fall in pressure over Samar and southern Luzon gave the impression that the storm was intensifying, but evening observations showed that this process did not continue. The center moved toward the eastern part of the Balintang Channel, where it recurved to the northeast. Apparently the depression was of minor importance, and if it were violent, it was such only over a very small area.

About four or five days previous to November 25, the east quadrant winds over Guam increased to values as high as 60 k. p. h. at a few levels, and in general showing a current flowing about 40 to 50 k. p. h. Over the Philippines, winds from the northeast and east quadrants existed until November 25, but the velocities were never over 30 k. p. h. A weak northeast quadrant current was flowing over Manila, Cebu, and Zamboanga November 25, and backing to the north and northwest during the afternoon. November 26 and 27, weak winds from the west and southwest quadrants were reported over Zamboanga and Cebu. Above 3,000 meters over Zamboanga there was an easterly current veering to the southeast, November 27. Manila's upper winds backed from east to north-northwest during these days. On November 28, all directions were from the northeast and east quadrants. The velocities were never over 45 k. p. h. during these days. When the center was east of northern Luzon and about to recurve, Aparri reported northeast and north winds, with velocities about 50 k. p. h. at various levels. It seems from available data that the air was attracted toward the center, an impression that might be changed when ascension reports from southern regions are received.

FLOOD LOSSES AND SAVINGS FOR THE YEAR 1939

BENNETT SWENSON

[Weather Bureau, Washington, January 1941]

Estimated flood losses for the year 1939 and savings reported as the result of warnings are tabulated below. The total loss has been estimated at \$13,833,806, with a saving of more than \$2,000,000. A total of 83 lives were lost.

The year 1939, except for one or two instances, was free from severe floods. The most severe single flood probably was the flash flood in eastern Kentucky on July 4 and 5. In this flood, which occurred in the mountain streams in the upper Licking and Kentucky River basins, 78 lives were lost, and an estimated monetary loss of more than \$1,700,000 was suffered in four counties.

Estimated flood losses and savings for 1939

River and drainage	Tangible property	Matured crops	Prospective crops	Livestock and other movable farm property	Suspension of business	Total	Lives lost	Reported savings as the result of warnings
ST. LAWRENCE								
Grand River in Michigan					\$11,100	\$11,100		
ATLANTIC SLOPE								
Tioughnoga and Chenango Rivers	\$125	\$1,000			700	1,825		\$1,700
Chemung River	4,000	600			5,000	9,600	2	15,000
Susquehanna River	43,350	100		\$500	900	44,850		31,200
Roanoke River	340	25,000	\$37,500	3,000	37,740	103,580		77,200
Tar River	100	18,000	22,500	3,000	4,740	48,340		15,600
Nouse River	2,500	18,000	30,500	3,200	14,740	68,940		22,000
Cape Fear River	500	22,000	23,500	3,200	5,740	54,940		35,500
Peedee River	16,500		55,000	2,000	8,000	81,500		36,000
Saluda River	3,680	400				4,080		11,500
Broad River, in South Carolina		50	150			200		1,300
Congaree River				100	510	610		2,150
Catawba-Waterloo River	300		10,000	1,000	3,800	15,100		31,700
Santee River	3,500			3,000	6,000	12,500		7,500
Savannah River	500			750	10,000	11,250		100,000
Ogeechee River				100	2,000	2,100		5,000
Altamaha River	9,500		12,750	5,800	23,150	51,200		112,575
EAST GULF OF MEXICO								
Flint River	(1)				50	50		1,000
Apalachicola River	2,000	1,000		1,500	6,760	11,260		9,000
Choctawhatchee River	24,050	510,700	250	700	500	536,200		4,100
Coosa River	31,950	250,000	50,000	270	3,300	335,520		1,850
Alabama River	631,000	1,108,000	420,000	49,000	6,500	2,214,500		71,000
Black Warrior-Tombigbee River						\$3,545,600		15,200
Pearl River	9,770	1,000	7,900	5,450	12,650	36,770	1	47,500
MISSISSIPPI SYSTEM								
<i>Upper Mississippi Basin</i>								
Chippewa River	1,650					1,650		
Wisconsin River	1,375		300		3,400	5,075		67,500
Rock River					200	200		
Iowa River	2,600	200				2,800		
Des Moines River	9,350	790	3,940	100	2,220	16,400		15,400
Salt River			71,000		5,500	76,500		
Illinois River	2,100					2,100		
Meramec River	15,150	200	40,600	75	6,500	62,525		32,600
Mississippi River above Cairo, Ill.	43,275	500	14,875	200	1,650	60,500		45,700
<i>Missouri Basin</i>								
Big Muddy River	5,000					5,000		
Mills River	150,000			50,000		200,000		
Solomon River	42,750	3,000	31,200	4,000	2,000	82,950		17,800
Big Blue River	12,000					12,000		
Grand River in Missouri	55,000	1,200		900		57,100		20,000
Missouri River	36,250	31,525	159,850	7,500	17,200	252,325		127,100
<i>Ohio Basin</i>								
Allegheny River					500	500		20,000
Monongahela River	23,000			10,000	3,000	36,000		20,000
Little Kanawha River	21,800			1,000		22,800		
Oleantang River			10,000			10,000		
Scioto River			52,000			52,000		
Licking River						\$1,365,000	27	
Kentucky River						\$350,000	51	
Green River	13,800	1,000	7,700		32,000	54,500		93,000
White River in Indiana	48,075		150,300	1,000	43,550	242,925		137,000
Wabash River	173,650	3,500	341,376	11,800	41,800	572,126	2	292,700
Cumberland River						\$638,640		168,100
Ohio River	105,700	2,500	159,100	5,600	155,400	428,300		468,000
<i>White-Arkansas Basin</i>								
Black River	1,500		500			2,000		
White River	50		6,600		2,600	9,250		
Cowskin and Big Slough Creeks in Kansas			45,000			45,000		
Ninnescah River			5,000			5,000		
North Canadian River	14,800	7,500	22,950			45,250		5,000
South Canadian River	29,000	4,100				33,100		
Poteau River	5,000	3,000	2,800		1,500	12,300		
Petit Jean River	350			100		450		500
Arkansas River	2,000		20,000		2,000	24,000		5,000
<i>Red Basin</i>								
Sulphur River								1,100
Ouachita River	3,000		2,000	1,900	16,300	22,200		104,000

(1) Figures not available.

* Furnished by U. S. Engineer Office.

Estimated flood losses and savings for 1939—Continued

River and drainage	Tangible property	Matured crops	Prospective crops	Livestock and other movable farm property	Suspension of business	Total	Lives lost	Reported savings as the result of warnings
Lower Mississippi Basin								
St. Francis River.....	60,250		1,205,000	6,000	51,850	1,323,100		170,525
Tallahatchie River.....			125,000			125,000		
WEST GULF OF MEXICO								
Trinity River.....	800		1,500	75		2,375		12,000
Colorado River.....	350,000					350,000		
Rio Grande.....	5,800	1,500				7,300		
GULF OF CALIFORNIA								
Colorado Basin								
Gila River.....	12,950					12,950		
Total.....						13,833,806	83	2,278,300

RIVER STAGES AND FLOODS

By BENNETT SWENSON

Heavy rains and floods occurred in eastern Texas during November 1940. The floods were confined mainly to the Sulphur, Sabine, Neches, and Trinity Rivers and the lower portions of the Brazos, Colorado, and Guadalupe Rivers. The overflow was quite extensive but losses were minimized somewhat due to the fact that most of the crops had been harvested.

For several days, November 22 to 26, low pressure persisted over southern Texas, with an extensive mass of dense, polar air to the north. This resulted in widespread precipitation from eastern Texas, northward to Kansas and southeastern Missouri.

Some of the 24-hour amounts in Texas were as follows: In the Sulphur River drainage, Ringo Crossing, 2.50 inches on the 23d and 0.62 on the 24th; Naples, 2.00 inches on the 23d and 1.67 on the 24th; in the Sabine Basin, Logansport, La., had 11.33 on the 23d and 4.67 on the 24th; Rockland, in the Neches watershed, had 5.75 on the 24th and 3.27 on the 25th; in the Trinity Basin, Trinidad, had 2.60 on the 23d and 2.58 on the 24th; and Long Lake, 8.21 and 9.26, on the same dates; in the Brazos watershed, Valley Junction, had 4.95 and 3.19 on the 23d and 24th, Washington, 9.60 and 2.68; and Hempstead, 16.00 and 4.46, on the 24th and 25th; and in the Colorado Basin, Columbus, had 4.11 and 7.35 on the 24th and 25th.

Generally over the country, the precipitation during the month was well above normal in much of the Great Basin in the West and east of the Rocky Mountains except the extreme Southeast. Accounts of the floods are given below:

Atlantic Slope Drainage.—Light to moderate floods occurred in the lower portions of the Roanoke, Neuse, and Cape Fear Rivers from the 15th to the 25th but no damage was reported.

The stages in the Pee Dee River were high near the middle of the month, but did not reach flood stage at any point.

A rise occurred in the Broad and Santee Rivers on the 14th. Flood stage was reached at Blairs, S. C., on the 14th and at Rimini, S. C., the stage in the Santee River was slightly above flood stage on the 16–17th.

Red River Basin.—Heavy rains on the 22–24th in the watersheds of the Ouachita and the Little Missouri Rivers resulted in a flood stage in the Ouachita River at Arkadelphia, Ark., on the 24th. The crest stage was 18.2

feet, 1.2 foot, above flood stage on the same day. The loss in Ouachita County has been estimated at \$1,000.

West Gulf of Mexico Drainage.—Heavy rains were general from November 21 to 26 over the upper Red River watershed and caused all of the streams to rise rapidly. However, flooding occurred only in the Sulphur River. At Ringo Crossing, Tex., a stage of 26 feet was reached on the 26th and at Naples, Tex., a stage of 27.4 feet on the 29–30th. The losses from this flood have been estimated at \$4,300.

Precipitation was excessive over portions of the Sabine, Neches, Trinity, and Brazos Rivers, as discussed elsewhere in this report, and the resulting floods were moderate to heavy. As the stages were still above flood stage at the close of the month a further report will be made on these floods.

In the lower watersheds of the Colorado and Guadalupe Rivers excessive rains caused floods from November 24 to 29. Crest stages in the Colorado were 36.5 feet at Columbus, Tex., on the 25th and 35.3 feet at Wharton, Tex., on the 26th where the flood stages are 24 and 26 feet, respectively. In the Guadalupe River a crest of 28.5 feet (7.5 feet above flood stage) occurred at Victoria, Tex., on the 26th. Losses have been estimated at \$82,000 in the Colorado River and \$7,500 in the Guadalupe River.

Pacific Slope Drainage.—Light flooding on November 29 in the Santiam River was confined to the bottom lands. No material damage was reported.

FLOOD-STAGE REPORT FOR NOVEMBER 1940

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE		Feet		Feet	
James: Columbia, Va.....	10	15	15	10.3	15
Roanoke:					
Weldon, N. C.....	31	15	18	34.8	16
Williamston, N. O.....	10	20	25	10.7	23
Neuse:					
Neuse, N. C.....	14	16	18	15.2	17
Smithfield, N. O.....	13	17	19	14.0	19
Haw: Moncure, N. C.....	20	15	15	20.5	15
Cape Fear: Lock No. 2, Elizabethtown, N. C.....	22	16	18	24.7	17
Broad: Blairs, S. C.....	14	14	14	14.0	14
Santee: Rimini, S. O.....	12	16	17	12.4	17
MISSISSIPPI SYSTEM					
Red Basin					
Ouachita: Arkadelphia, Ark.....	17	24	24	18.2	24
Sulphur:					
Ringo Crossing, Tex.....	20	11	14	23.0	11
Naples, Tex.....	22	23	30	26.0	26
		27	(1)	27.4	29-30
WEST GULF OF MEXICO DRAINAGE					
Sabine: Logansport, La.....	25	24	(1)	35.9	27
Neches: Rockland, Tex.....	22	26	(1)	25.5	30
Trinity:					
Dallas, Tex.....	28	25	28	32.4	26
Trinidad, Tex.....	28	24	(1)	34.6	27
Long Lake, Tex.....	40	25	(1)	46.0	28
Riverside, Tex.....	40	26	27	40.1	27
Liberty, Tex.....	24	25	(1)	26.9	29-30
Brazos:					
Waco, Tex.....	27	26	26	27.2	26
Valley Junction, Tex.....	44	25	27	47.4	26
Washington, Tex.....	45	27	(1)	47.6	29
Hempstead, Tex.....	40	24	(1)		
Richmond, Tex.....	35	26	(1)	38.7	28
Colorado:					
Columbus, Tex.....	24	24	25	36.5	25
Wharton, Tex.....	26	25	27	35.3	26
Guadalupe:					
Gonzales, Tex.....	20	6	6	21.0	6
		24	24	20.4	24
Victoria, Tex.....	21	6	10	27.1	9
		26	29	28.5	26
PACIFIC SLOPE DRAINAGE					
Columbia Basin					
Santiam: Jefferson, Oreg.....	10	29	29	10.3	29

¹ Continued into following month.